Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A method of providing wireless data communication service between a moving object having a communication server and a first ground station, the method comprising:

establishing a radio communication path between the moving object and a first ground station;

establishing a connection between the first ground station and a second ground station;

bridging the radio communication path from the first ground station to the second ground station;

transmitting data to the second ground station via the first ground station using a first protocol associated with the radio communication path and a second protocol associated with the connection between the first ground station and the second ground station; and

establishing a link layer connection between the moving object and the first ground station using a point-to-point protocol.

2. (Original) A method of providing wireless data communication services, comprising:

establishing a radio communication path, via a voice network, between a moving object and a first ground station using a data communication server co-located with the moving object, the data communication server including a plurality of interface units for accessing different data networks including an Ethernet interface unit, an Integrated Services Digital Network (ISDN) interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including the steps of:

sending a channel request signal to the first ground station; and

receiving an acknowledgement signal, including a channel

assignment, back from the first ground station indicating a channel is

being made available and being assigned for the radio communication

path;

initiating call setup procedures including sending in-band signaling to the first

ground station in response to a tone from the first ground station, the first ground

station, in response to the in-band signaling, establishing a connection with a second

ground station and bridging the radio communication path with the connection to the

second ground station;

training at least one modem of the moving object to be in communication with a

first ground station modem, the first ground station modem substantially simultaneously

training itself to be in communication with a second ground station modem;

transmitting data to said second station, via the first ground station, using a pre-

determined protocol for the radio communication path and second pre-determined

protocol for the connection between the first ground station and the second ground

station; and

establishing a link layer connection between the moving object and the first

ground station using a point-to-point protocol over the voice network.

3. (Original) The method of claim 2, wherein the moving object is a flying vehicle.

4.   (Original) A method of providing wireless data communication services,
comprising:

establishing a radio communication path, via a packet data network, between a

moving object and a ground station using a data communication server co-located with

the moving object, the data communication server including a plurality of interface units

for accessing different data networks including an Ethernet interface unit, an ISDN

interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including:

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sending a channel request signal, via the ISDN interface unit and a

communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit

and the communication unit, including a channel assignment, back from

the ground station indicating a channel is being made available and being

assigned for the radio communication path; and

transmitting data to said ground station over said packet data network using a B-
channel ISDN link, said data packets being IP packets encapsulated in a point-to-point
protocol frame.

5. (Original) The method of claim 4, wherein said moving object is a flying
vehicle.

6. (Original) The method of claim 4, wherein said step of transmitting includes
tunneling the point-to-point frame to said ground station using a tunneling protocol, at
layer two of a protocol stack, said tunneling enabling a plurality of radio communication
paths between the moving object and the ground station, and enabling a higher data
transmission rate than that allowable without tunneling.

7. (Original) The method of claim 4, wherein said radio communication path
between the moving object and the ground station is shared by voice and data traffic
with said data traffic being interleaved over said voice traffic, said data traffic being
inserted, via data frames, into existing voice traffic channels when silence is detected on
the existing voice traffic channels.

8. (Currently amended) ~~The method of claim 4, further comprising:~~
A method of providing wireless data communication services, comprising:
establishing a radio communication path, via a packet data network, between a
moving object and a ground station using a data communication server co-located with
the moving object, the data communication server including a plurality of interface units

for accessing different data networks including an Ethernet interface unit, an ISDN
interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including:

sending a channel request signal, via the ISDN interface unit and a
communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit
and the communication unit, including a channel assignment, back from
the ground station indicating a channel is being made available and being
assigned for the radio communication path; and

transmitting data to said ground station over said packet data network using a B-
channel ISDN link, said data packets being IP packets encapsulated in a point-to-point
protocol frame;

assigning a channel thread to the radio communication path, and assigning an IP
address to an air station, interconnected to the data communication server, for the
moving object;

recording the air station IP address assignment and channel thread assignment
in a location table;

establishing an alternative radio communication path, initiating a hand-off, via the
air station, with an alternative ground station, and subsequently terminating the radio
communication path with the ground station, a new channel thread being assigned and
the air station being assigned a new IP address that establishes the alternative radio
communication path, the location table being updated with the new air station IP
address and new channel thread assignment, and said alternative radio communication
path being established in response to a pre-determined hand-off algorithm being
satisfied; and

data packets to be routed from the ground station to the moving object being
routed by looking up the current air station IP address from the location table and
inserting this IP address into the packets.

9. (Original) The method of claim 8, wherein the pre-determined hand-off
algorithm is a hand-off procedure selected from the group consisting of a hand-off being

initiated when pre-determined distance and call time thresholds are satisfied, a hand-off being initiated when pre-determined distance and error rate thresholds are satisfied, a hand-off being initiated when pre-determined first distance, second distance, and call time thresholds are satisfied, and a hand-off being initiated when pre-determined call time, error rate, and distance thresholds are satisfied.

10. (Original) A method of providing data communication services, comprising:

establishing a radio communication path, via an INMARSAT satellite system and using a packet data protocol, between a moving object and a first ground station using a data communication server and a satellite communication unit co-located with the moving object, the data communications server including a plurality of interface units for accessing different data networks including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including the steps of:

sending a channel request signal, via the ISDN interface unit and a communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit and the communication unit, including a channel assignment, back from the ground station indicating a channel is being made available and being assigned for the radio communication path; and

transmitting data to said ground station over said INMARSAT satellite packet data network using either of D-channel ISDN link or ARINC link between the data communication server and the satellite communication unit, said data packets being IP packets.

11. (Original) A method of providing data communication services, comprising:

establishing a radio communication path, via a Direct Broadcast satellite system and internet service provider, between a moving object and a ground station of the internet service provider using a data communication server and a satellite communication server co-located with the moving object, the data communication server including a plurality of interface units for accessing different data networks

including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including the steps of:

sending a channel request signal and pre-determined access management information including a client IP map, via the ISDN interface unit and a communication unit, to the ground station of the internet service provider; and

receiving an acknowledgement signal via the ISDN interface unit and the communication unit, including a channel assignment, indicating a channel is being made available and being assigned for the radio communication path; and

transmitting data to said ground station of the Internet service provider over said direct broadcast satellite system enabling usage of Internet services by a user in the moving object, said data being transmitted as an IP packet encapsulated in a point-to-point frame.

12. (Original) A method of providing data communication services, comprising:

establishing a radio communication path, via a packet data network using circuit mode data, between a moving object and a ground station of the internet service provider using a data communication server and a satellite communication server co-located with the moving object, the data communications server including a plurality of interface units for accessing different data networks including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including:

sending a channel request signal, via the ISDN interface unit and a communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit and the communication unit, including a channel assignment, back from the ground station indicating a channel is being made available and being assigned for the radio communication path;

training at least one modem of the moving object to be in communication with a ground station modem, the first ground station modem substantially simultaneously training itself to be in communication with a second ground station modem; and

transmitting data to said ground station over said packet data network using an end-to-end transmission control protocol/internet protocol (TCP/IP) circuit.

13. (Currently amended) ~~The method of claim 12, further comprising:~~

A method of providing data communication services, comprising:

establishing a radio communication path, via a packet data network using circuit mode data, between a moving object and a ground station of the internet service provider using a data communication server and a satellite communication server co-located with the moving object, the data communications server including a plurality of interface units for accessing different data networks including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit;

said step of establishing including:

sending a channel request signal, via the ISDN interface unit and a communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit and the communication unit, including a channel assignment, back from the ground station indicating a channel is being made available and being assigned for the radio communication path;

training at least one modem of the moving object to be in communication with a ground station modem, the first ground station modem substantially simultaneously training itself to be in communication with a second ground station modem; and

transmitting data to said ground station over said packet data network using an end-to-end transmission control protocol/internet protocol (TCP/IP) circuit;

assigning a channel thread to the radio communication path, and assigning an IP address to an air station, interconnected to the data communication server, for the moving object;

recording the air station IP address assignment and channel thread assignment in a location table;

establishing an alternative radio communication path, initiating a hand-off, via the air station, with an alternative ground station, and subsequently terminating the radio communication path with the ground station, a new channel thread being assigned and the air station being assigned a new IP address that establishes the alternative radio communication path, the location table being updated with the new air station IP address and new channel thread assignment, and said alternative radio communication path being established in response to a pre-determined hand-off algorithm being satisfied; and

said data packets to be routed from the ground station to the moving object being routed by looking up the current air station IP address from the location table and inserting this IP address into the packets.

14. (Original) The method of claim 13, wherein the pre-determined hand-off algorithm is a hand-off procedure selected from the group consisting of a hand-off being initiated when pre-determined distance and call time thresholds are satisfied, a hand-off being initiated when pre-determined distance and error rate thresholds are satisfied, a hand-off being initiated when pre-determined first distance, second distance, and call time thresholds are satisfied, and a hand-off being initiated when pre-determined call time, error rate, and distance thresholds are satisfied.

15. (Original) A method of providing data communication services, comprising:
establishing a radio communication path, via a packet data network using circuit mode data, between a moving object and a ground station using a data communication server co-located with the moving object, the data communications server including a plurality of interface units for accessing different data networks including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit;
said step of establishing including:
sending a channel request signal, via the ISDN interface unit and a communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit
and the communication unit, including a channel assignment, back from
the ground station indicating a channel is being made available and being
assigned for the radio communication path;

and

transmitting data to and receiving data from said ground station over said packet
data network, said data including either of user information or moving object operation
information.

16. (Original) The method of claim 15, wherein said data communication server
includes software architecture including software functional layers, the layers including a
system resources layer, a system services layer, an application programming interface
layer, and an application layer, and the application programming interface layer
including components representable by objects for providing communication services
with each object including a communicator, a receptor, and service logic.

17. (Original) The method of claim 15, wherein said steps of transmitting and
receiving includes providing packet handling services, the packet handling services
including a radio data bridge across the radio communication path, via a data link layer
of a protocol stack, the radio data bridge including end-to-end error correction and end-
to-end packet sequencing; and
the radio data bridge including either of a half-rate, full-rate, or combination of
half-rate and full-rate channels across the radio communication path.

18. (Original) The method of claim 15, further comprising:
assigning a pre-determined IP address to the ground station; and
allowing access to said transmitted and received information only for pre-
determined users of said IP address.

19. (Original) The method of claim 15, further comprising:

performing authentication procedures, using a remote access dial-up service to a ground server, on users before allowing access to said transmitted and received information only for pre-determined users of said IP address; and

securing said transmitted and received user information from unauthorized access using a secure socket layer protocol.

20. (Original) The method of claim 15, further comprising:

performing authentication procedures, using a remote access dial-up service to a ground server, on users before allowing access to said transmitted and received information only for pre-determined users of said IP address; and

securing said transmitted and received user information from unauthorized access using a PGP security protocol;

said step of securing including the steps of:

creating a digital signature by generating a hashing code of the user information to be transmitted;

encrypting the code with the user's private key;

encrypting the user information using a randomly created session key; and

encrypting the session key using the public key of a recipient of the user information.

21. (Original) The method of claim 20, further comprising:

decrypting the session key using the user's private key, enabling decryption of the user information and verification of the digital signature;

decrypting an encrypted block of user information using the session key; and

verifying the digital signature by decrypting the hash code using the user's public key.

22. (Original) A method of providing wireless data communication services, comprising:

establishing a radio communication path, via a packet data network, between a moving object and a ground station using a data communication server and a radio communication unit co-located with the moving object, the data communication server including a plurality of interface units including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit for accessing different data networks, the radio communication unit including a plurality of communication services for controlling a data link connection across the radio communication path including packet data seizure override and established packet data link override, and the ground station including radio channel services, including a radio data link layer having end-to-end error correction and packet sequencing, allowing multiple simultaneous packet data sessions and providing error rate measurements to the moving object for initiating a hand-off, for communicating with a terrestrial ground data gateway;

said step of establishing includes the steps of:

sending a channel request signal, via the ISDN interface unit and a communication unit, to the ground station; and

receiving an acknowledgement signal via the ISDN interface unit and the communication unit, including a channel assignment, back from the ground station indicating a channel is being made available and being assigned for the radio communication path; and

transmitting data to said ground station over said packet data network using a B-channel ISDN link, said data packets being IP packets encapsulated in a point-to-point protocol frame.

23.   (Currently amended) A data communication server for providing communication services, comprising:

a plurality of interface units, including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit, for accessing different data networks; and

a software architecture including software functional layers, the layers including a system resources layer, a system services layer, an application programming interface

layer, and an application layer, and the application programming interface layer including components representable by objects for providing communication services with each object including a communicator, a receptor, and service logic;

wherein the data communication server is co-located with a moving object.

24. (Original) A system for providing communication services, comprising:

a data communication server, co-located with the moving object, for establishing a radio communication path between a moving object and a ground station including a plurality of interface units for accessing different data networks including an Ethernet interface unit, an ISDN interface unit, and a pre-determined wireless data network interface unit,

the data communication server including software architecture including software functional layers, the layers including a system resources layer, a system services layer, an application programming interface layer, and an application layer, and the application programming interface layer including components representable by objects for providing communication services with each object including a communicator, a receptor, and service logic;

a radio communication unit, co-located with the moving object, including a plurality of communication services for controlling a data link connection across the radio communication path including packet data seizure override and established packet data link override;

the ground station including radio channel services, including a radio data link layer having end-to-end error correction and packet sequencing, allowing multiple simultaneous packet data sessions and providing error rate measurements to the moving object for initiating a hand-off, for communicating with a terrestrial ground data gateway.